

Claims

1. Method for recovering a phytochemical from hulls of a seed, which method comprises fractionating a seed material comprising the hulls, thereby obtaining a fraction enriched in hulls and extracting the lignan from said fraction.
- 5 2. Method according to claim 1, wherein the fractionating encompasses fractionating based upon particle size.
3. Method according to claim 2, wherein the fractionating encompasses sieving, screening or a combination thereof.
4. Method according to any one of the preceding claims, wherein the 10 fractionating encompasses fractionating based upon specific weight.
5. Method according to claim 4, wherein the fractionating based upon specific weight is carried out by employing at least one specific gravity table, at least one wind sifter or a combination thereof.
6. Method according to any one of the preceding claims, wherein the 15 fraction enriched in hulls is identified by a visual evaluation, a specific weight evaluation or a combination thereof.
7. Method according to claim 6, wherein the fraction enriched in hulls has a specific weight in the range of 20-50 kg/hl, preferably in the range of 25-38 kg/hl, more preferably in the range of 25-30 kg/hl.
- 20 8. Method according to anyone of the preceding claims, wherein the phytochemical is extracted by liquid extraction, preferably by liquid extraction with water, a C₁-C₄ alcohol or a mixture thereof.
9. Method according to anyone of the preceding claims, comprising releasing or liberating at least part of the hulls in the seed material, preferably 25 by rollermilling or hammermilling.
10. Method according to any one of the preceding claims, wherein the seed material is defatted.

11. Method according to any one of the preceding claims, wherein the seed material is a meal, preferably a coarse meal.
12. Method according to any one of the preceding claims, wherein the seed material is based upon at least one seed selected from the group consisting of *Linaceae*, *Poaceae*, *Brassicaceae*, *Arecaceae*, *Malvaceae*, *Juglandaceae*, *Papilionaceae*, *Asteraceae*, *Pedaliaceae*, *Rosaceae*, *Apiaceae* and *Anacardiceae*.
13. Method according to any one of the preceding claims, wherein the phytochemical is a phenolic.
- 10 14. Method according to claim 13, wherein the phenolic is selected from the group consisting of lignans, flavonoids and stilbenes, preferably from the group of lignans.
- 15 15. Method according to claim 14, wherein the fraction enriched in hulls has a lignan content of more than 1.5 wt. % based upon the dry substance, preferably of more than 1.7 wt. % based upon the dry substance, more preferably of at least 2 wt % based upon the dry substance.
16. Fraction enriched in hulls obtainable by a method according to any one of the preceding claims.
17. Extract, obtainable by a method according to any one of the claims 20 1-15.
18. Extract according to claim 17, comprising 10-50 wt. %, based upon the dry weight, of the phytochemical, such as the lignan, and at least one carbohydrate, wherein the total carbohydrate to phytochemical weight to weight ratio is at least 0.2.
- 25 19. Extract according to claim 18, comprising 15-40 wt. %, based upon the dry weight, of the phytochemical.
20. Extract according to claim 18 or 19, comprising 20-35 wt. %, based upon the dry weight, of a gum.

21. Extract according to any of the claims 17-20, comprising a solvent selected from the group consisting of water, C₁-C₄ alcohols and mixtures thereof.

22. Product selected from foodstuffs, food supplements, cosmetic products, hair care products, body care products, animal feeds, pet foods, neutraceuticals, cosmeceuticals and medicaments, comprising a fraction enriched in hulls according to claim 16 or an extract according to any one of the claims 17-21.

23. Product, optionally according to claim 22, comprising a fraction enriched in hulls according to claim 16 or an extract according to any one of the claims 17-21 and at least one component selected from the group consisting of:

- Anti-oxidants; such as representatives from the group of lycopenes, quercitin derivatives, Co-enzyme Q10, phenolic acids.
- Phytosterols
- Essential fatty acids and conjugated linoleic acid (CLA);
- Vitamins; such as representatives from the group of Vit. C, E (tocopherols), K, B, A
- Minerals; such as organic and inorganic sources of Selenium, Chromium, Zinc, Calcium, Magnesium, Phosphor, Iron, Copper, Manganese
- Amino acids; such as alanin, glutamic acid and glycine
- Bio-active peptides
- Probiotics, such as *Lactobacillus* and Bifido; and
- Prebiotics, such as oligosaccharides such as fructo-oligosaccharides and fibers such as inulin capable of stimulating specific intestinal microorganisms.

24. Use of a lignan, a fraction enriched in hulls according to claim 16, an extract according to any one of the claims 17-21 or a product according to claim 22 or 23 for preventing or treating hair loss.

25. Use of a lignan, a fraction enriched in hulls according to claim 16, an extract according to any one of the claims 17-21 or a product according to claim 22 or 23 for preventing or preventing or treating an oily appearance of the skin or a dermatological aging effect.

5 26. Use of a lignan, a fraction enriched in hulls according to claim 16, an extract according to any one of the claims 17-21 or a product according to claim 22 or 23 in the manufacture of a medicament for the treatment or prevention of benign prostatic hyperplasia.

27. Use of a fraction enriched in hulls according to claim 16, an extract 10 according to any one of the claims 17-21 or a product according to claim 22 or 23 in the manufacture of a medicament for the treatment or prevention of

- cancers, in particular a cancer selected from cancers of the breast (mammary tumorigenesis), the uterine, the prostate, the endometrium, the thyroid, the lung, the colorectum, the stomach, the colon, and the skin;
- of coronary heart disease; cardiovascular disease; atherosclerosis; thrombosis;
- blood pressure related medical indications;
- osteoporosis; bone mineral density related indications; osteoporotic fractures,

20 - bone metabolism related indications

- urinary symptoms
- kidney disease; lupus nephritis
- hair loss; baldness; alopecia
- a dermatological indication such as acne, oily skin appearance,

25 aging skin

- diabetes; diabetic nephropathy; renal disease
- obesity;
- pre-, peri-, post-menopausal symptoms; menstrual cycle

28. Use of a fraction enriched in hulls according to claim 16, an extract 30 according to any one of the claims 17-21 or a product according to claim 22 or

23 for controlling body weight, for the improvement of immune response or for the improvement of a cognitive function.